

MAY 27, 1976

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ANNCR: THE VOICE OF AMERICA PRESENTS ... SCIENCE NOTEBOOK ...

A SUMMARY OF EVENTS IN SCIENCE, MEDICINE AND
TECHNOLOGY. EACH WEEK AT THIS TIME, WE BRING YOU
REPORTS ON DEVELOPMENTS THAT MAY AFFECT OUR DAILY
LIVES. WITH THE FIRST STORY, HERE IS YOUR SCIENCE
EDITOR _____:

(CLIMATE CONCERNS --3-3497-- DRISCOLL/DOSA)

EDITOR: RECENT NEWS REPORTS CARRIED PREDICTIONS OF CHANGES IN
THE GLOBAL CLIMATE WHICH COULD LEAD TO SEVERE FOOD
SHORTAGES. HERE IS _____ WITH A
BACKGROUND REPORT:

VOICE: THANKS TO COMPUTERS AND METEOROLOGICAL SATELLITES,
WE CAN PREDICT THE WEATHER WITH MUCH GREATER ACCURACY
THAN BEFORE, BUT COMPLETE ANSWERS TO THE QUESTION
OF WHY THE WEATHER CHANGES STILL ELUDE THE WORLD'S
SCIENTISTS. HOWEVER, GLOBAL METEOROLOGICAL TRENDS
OBSERVED DURING THE LAST FEW YEARS HAVE CAUSED A
GROWING NUMBER OF AGRONOMISTS, METEOROLOGISTS AND
ECONOMISTS TO SOUND AN ALARM OVER THE CHANGING
WEATHER AND ITS POTENTIAL IMPACT ON FOOD PRODUCTION.

UNTIL RECENTLY, THE THREE DECADES ENDING IN 1960 HAD
BEEN CONSIDERED AS A CLIMATIC NORM, OR REFERENCE
PERIOD, TO BE REGARDED AS A BASIS OF COMPARISON WITH
THE WEATHER IN OTHER PERIODS. BUT CLIMATOLOGIST REID

VOICE:

(CONT'D) DRYSON, OF THE UNIVERSITY OF WISCONSIN, HAS FOUND EVIDENCE THAT THIS THIRTY-YEAR PERIOD WAS ACTUALLY PART OF THE MOST ABNORMALLY WARM ERA OF THE LAST ONE-THOUSAND YEARS.

THE WARMING PERIOD STARTED IN 1912 AND RAN THROUGH 1940 WHEN TEMPERATURES IN THE NORTHERN PART OF THE NORTHERN HEMISPHERE BEGAN A GRADUAL COOLING -- A PROCESS THAT HAS SHORTENED THE GROWING SEASON BY SEVERAL WEEKS IN COUNTRIES LIKE CANADA, ICELAND AND ENGLAND.

ACCORDING TO DOCTOR DRYSON, THE COOLING OF THE CLIMATE IN THE NORTH AFFECTED THE ATMOSPHERIC WIND CIRCULATION AROUND THE ENTIRE GLOBE. IT RESULTED IN ALTERNATING YEARS OF DROUGHT AND FLOOD, AS WELL AS TEMPERATURE EXTREMES IN THE WORLD'S MAJOR GRAIN GROWING REGIONS. THE WINDS ALSO RETARD THE MONSOONS THAT BRING LIFE-SUSTAINING WATER TO INDIA AND PARTS OF AFRICA.

DOCTOR DRYSON'S OBSERVATIONS ON THE CHANGING CLIMATE ARE SUPPORTED BY TANGIBLE EVIDENCE. TWO YEARS AGO, BAD WEATHER LED TO A SUBSTANTIAL DROP IN THE AGRICULTURAL PRODUCTION OF THE UNITED STATES AND CANADA. CORN YIELDS WENT DOWN BY AS MUCH AS TWENTY PERCENT. WHEAT AND SOYBEAN PRODUCTION ALSO DROPPED. AND SINCE MORE THAN NINETY PERCENT OF THE WORLD'S CEREAL IMPORTS COME FROM NORTH AMERICA, THIS DECREASE IS AFFECTING WORLD FOOD SUPPLIES BECAUSE OF THE LOWERING OF THE WORLD'S FOOD RESERVES.

VOICE:

(CONT'D) THE MESSAGE THE CLIMATOLOGISTS TRY TO IMPART IS NOT ONE OF IMMINENT DOOM. BUT THEY POINT OUT THAT DURING RECENT PERIODS OF UNUSUALLY GOOD WEATHER, MAN BECAME COMPLACENT. THE WEATHER BROUGHT THE NECESSARY SUMMER RAINFALL AT MID-LATITUDES. THE GREEN REVOLUTION -- LARGE-SCALE APPLICATION OF TECHNOLOGY, HYBRID PLANTS, FERTILIZERS AND PESTICIDES -- RESULTED IN GREAT INCREASES IN FOOD PRODUCTION. BUT WE HAVE FAILED TO TAKE WEATHER INTO FULL ACCOUNT, AND THE SCIENTISTS WARN US THAT AS WE LOOK TO THE FUTURE GRAIN PRODUCTION, WE MUST RECOGNIZE THAT WEATHER IS BECOMING A LIMITING FACTOR IN FOOD PRODUCTION.

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(ABORTION AND LATER PREGNANCIES 3-3497 -- CASHDAN)

EDITOR: A TEAM OF BOSTON GYNECOLOGISTS IS ABOUT TO LAUNCH A NEW STUDY ON ABORTION. LINDA CASHDAN HAS THAT STORY:

VOICE: THE IMMEDIATE RESULT OF ABORTION IS OBVIOUS: IT ENDS A PREGNANCY. BUT DOCTORS ARE BEGINNING TO QUESTION WHETHER THE OPERATION MAY HAVE LONG RANGE EFFECTS AS WELL, SPECIFICALLY, WHETHER INDUCED ABORTIONS MAY CAUSE PROBLEMS IN LATER PREGNANCIES.

SCATTERED REPORTS FROM COUNTRIES WHERE ABORTIONS HAVE BEEN LEGAL FOR YEARS HAVE INDICATED THIS MAY BE TRUE.

VOICE:

(CONT'D) ONE CZECH STUDY, FOR EXAMPLE, FOUND THAT TWENTY TO THIRTY PER CENT OF THE WOMEN WHO UNDERWENT INDUCED ABORTIONS WERE EITHER UNABLE TO BECOME PREGNANT AT A LATER TIME, OR SUFFERED MISCARRIAGES WHEN THEY DID BECOME PREGNANT. SIMILAR FINDINGS HAVE BEEN REPORTED IN STUDIES FROM HUNGARY, JAPAN, ENGLAND, GREECE, POLAND, AND TAIWAN.

THERE ARE VARIOUS THEORIES TO EXPLAIN WHY ABORTIONS COULD AFFECT SUBSEQUENT PREGNANCIES. INTERRUPTING A PREGNANCY BY ANY UNNATURAL METHOD, DOCTORS REASON, COULD HAVE A LASTING, DISRUPTIVE EFFECT ON A WOMAN'S NERVOUS AND HORMONAL SYSTEMS. IN ADDITION, CERTAIN ABORTION PROCEDURES COULD INJURE THE LINING OF THE UTERUS OR WEAKEN THE CERVIX, WHICH MUST BE STRONG ENOUGH TO SEAL THE WOMB DURING PREGNANCY.

BUT THOSE ARE JUST THEORIES. THE PURPOSE OF THE NEW BOSTON STUDY IS TO GATHER SOME HARD SCIENTIFIC EVIDENCE. RESEARCHERS WILL STUDY SOME TWENTY FIVE THOUSAND PREGNANCIES OVER A FIVE YEAR PERIOD, COMPARING PREGNANCIES THAT OCCUR AFTER INDUCED ABORTIONS WITH CONTROL GROUPS OF PREGNANT WOMEN WITH NO HISTORY OF PRIOR ABORTIONS. THE COMPARISON WILL BE MADE BY STUDYING HOSPITAL RECORDS, AS WELL AS BY ACTUAL STUDY OF SUBJECTS AT THE TIME OF INDUCED ABORTION AND FOLLOWING THEM FOR AT LEAST FIVE YEARS. IN THE END, RESEARCHERS EXPECT TO HAVE SOME ANSWERS ON THE LONG RANGE EFFECT OF ABORTION.

(KEEPING SHIP BOTTOMS CLEAN --3-3497 -- DOSA)

EDITOR: SAILORS -- ON LARGE NAVAL SHIPS AND SMALL LEISURE BOATS -- MUST FIGHT A NEVER-ENDING BATTLE AGAINST BARNACLES AND OTHER MARINE PESTS THAT ATTACH THEMSELVES TO THE BOTTOMS OF THEIR VESSELS. BUT IT APPEARS NOW THAT THEY MAY BE FINALLY WINNING THAT BATTLE, AS _____ REPORTS.

VOICE: CHEMISTS OF THE U.S. NAVY HAVE DEvised A NEW SUBSTANCE TO COAT SHIP BOTTOMS SO THAT THEY REMAIN FREE OF BARNACLES. THERE ARE ALREADY SIMILAR SUBSTANCES IN USE BUT THEY DO NOT LAST VERY LONG AND RELEASE POISONOUS MATERIAL INTO THE WATER.

THE NEW COATINGS CONSIST OF POISONOUS ORGANIC SUBSTANCES WHICH ARE CHEMICALLY BONDED TO PLASTICS. THE PLASTIC KEEPS THE POISON IN PLACE. THAT IS, IT PREVENTS THE POISON FROM BEING LEACHED OUT BY THE SEAWATER, BUT THE SUBSTANCE REMAINS TOXIC FOR A LONG TIME TO KEEP THE MARINE PESTS FROM ATTACHING THEMSELVES TO THE SHIP'S BOTTOM.

THE MATERIAL WAS TESTED IN THE ATLANTIC OCEAN, OFF MIAMI. SUBMERGED PANELS, COATED WITH THE ANTI-BARNACLE MATERIAL, REMAINED CLEAR OF BARNACLES FOR MORE THAN FOUR YEARS. SOME OF THE TEST PANELS WERE MADE OF PLEXIGLAS AND THEY REMAINED SO CLEAR THAT ONE CAN STILL SEE THROUGH THEM. IN CONTRAST, UNCOATED PANELS BEGIN TO FILL UP WITH MARINE PESTS WITHIN WEEKS IN THE MIAMI WATERS, WHILE PANELS COATED WITH CONVENTIONAL PROTECTIVE MATERIALS LASTED LITTLE MORE THAN TWO YEARS.

VOICE:

(CONT'D) THE NEW ANTI-FARNACLE MATERIALS WILL REQUIRE FURTHER DEVELOPMENT SO THAT THEY CAN BE APPLIED LIKE ORDINARY PAINT TO A SHIP'S BOTTOM WHILE IN DRYDOCK. BUT ONCE THE COATINGS ARE READY FOR LARGE SCALE USE, THEY WILL MAKE LIFE FOR THE SAILORS MUCH EASIER. AND THEY PROMISE ANOTHER SIGNIFICANT ADVANTAGE: CLEAN SHIP BOTTOMS HELP SAVE FUEL. FARNACLES AND CORROSION ON THE BOTTOM INCREASE THE FRICTIONAL DRAG OF THE SHIP AND RESULT IN A TEN PERCENT GREATER FUEL CONSUMPTION. WITH TODAY'S HIGH FUEL PRICES, THE REDUCED FUEL CONSUMPTION COULD BRING ABOUT CONSIDERABLE SAVINGS FOR A FLEET OF WARSHIPS OR FISHING BOATS ALIKE.

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(NATO -- GEOTHERMAL ENERGY 3-3497APPLE/BRUSSELS)

EDITOR: ONE SOURCE OF ENERGY IS THE HEAT STORED WITHIN THE EARTH, CALLED GEOTHERMAL ENERGY. THE NORTH ATLANTIC TREATY ORGANIZATION'S COMMITTEE ON THE CHALLENGES OF MODERN SOCIETY IS STUDYING SEVERAL ASPECTS OF THIS "GEOTHERMAL ENERGY." EDIE APPLE REPORTS FROM BRUSSELS.

VOICE: SINCE ANCIENT TIMES MAN HAS USED NATURAL HOT SPRINGS FOR THEIR HEALTH BENEFITS. DURING THE LAST CENTURY, PEOPLE BEGAN TO MAKE COMMERCIAL USE OF THE MINERALS BROUGHT TO EARTH THROUGH GEYSERS AND HOT SPRINGS. THEN AT THE BEGINNING OF THIS CENTURY STEAM FROM THE EARTH WAS HARNESSSED TO PRODUCE ELECTRICITY. THE FIRST COMMERCIAL GEOTHERMAL POWER PLANT WAS BUILT IN 1904 IN THE TUSCANY REGION OF ITALY.

VOICE:

(CONT'D) GEOTHERMAL POWER PLANTS NOW EXIST IN THE SOVIET UNION, JAPAN, INDONESIA, NEW ZEALAND, ICELAND AND TURKEY. AND THEY ARE BEING BUILT IN A NUMBER OF OTHER AREAS, INCLUDING THE PHILIPPINES, EL SALVADOR AND GREECE. THE ONLY POWER PLANT IN THE UNITED STATES IS IN NORTHERN CALIFORNIA. THIS PLANT, THE LARGEST IN THE WORLD, CAN SUPPLY FIVE HUNDRED MILLION WATTS OF ENERGY -- ENOUGH TO PROVIDE HALF THE ELECTRICITY OF THE CITY OF SAN FRANCISCO.

ACCORDING TO DOCTOR JAMES BRESEE OF THE U-S ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION, GEOTHERMAL ENERGY IS POTENTIALLY AVAILABLE WHEREVER THERE ARE WHAT GEOLOGISTS CALL YOUNG MOUNTAINS. THIS MEANS MOUNTAINS LESS THAN FIFTY MILLION YEARS OLD. AS DOCTOR BRESEE EXPLAINS THIS INCLUDES A WIDE AREA OF THE EARTH.

TAPE: CUT ONE -- BRESEE

"GENERALLY SPEAKING, THE EDGE OF THE PACIFIC OR ALL THE WAY AROUND IT, FROM THE ALEUTIAN ISLANDS TO NEW ZEALAND, FROM THE ANDES MOUNTAINS TO JAPAN, AND THE KAMCHATKA PENINSULA HAS MUCH GEOTHERMAL ENERGY ... THE MID-OCEAN RIDGE OF THE ATLANTIC WHICH IS EXPRESSED IN ICELAND AND THE AZORES, A BELT RUNNING THROUGH THE MEDITERRANEAN -- IT IS BETWEEN AFRICA AND EUROPE AND IS THE AREA THAT CAUSES THE ALPS TO BE FORMED. THE AEGEAN ISLANDS OF GREECE HAVE THE GEOTHERMAL HEAT THAT EXTENDS INTO TURKEY AND ACTUALLY RUNS ALL THE WAY THROUGH THE HIMALAYAN MOUNTAINS UP TO THE EDGE OF THE PACIFIC. SO THERE IS A BAND THAT STRETCHES ALL THROUGH THE CENTER OF EURASIA, AND BETWEEN AFRICA AND EURASIA. SO, WHEN YOU CONSIDER ALL THIS AREA, AND SOME OF THE PLACES ARE VERY CROWDED -- THE ITALIAN PENINSULA, THE JAPANESE ISLANDS -- THEY ARE A VERY SIZEABLE FRACTION OF PEOPLE OF THE WORLD WHO ARE NEAR GEOTHERMAL ENERGY."

VOICE: UNDER ONE OF THE N-A-T-O PROJECTS ON GEOTHERMAL ENERGY, A SMALL EASILY-BUILT AND MASS-PRODUCED PORTABLE POWER PLANT HAS BEEN DESIGNED. AND DOCTOR BRESEE, WHO RUNS THE PROGRAM, HOPES ANOTHER INTERNATIONAL ORGANIZATION WILL TAKE UP THE PROJECT AND BUILD THESE PLANTS.

ANOTHER N-A-T-O STUDY INVOLVES TRYING TO SOLVE ENVIRONMENTAL PROBLEMS CONNECTED WITH GEOTHERMAL POWER PLANTS. PLANTS IN TUSCANY AND SAN FRANCISCO USE HOT STEAM TO PRODUCE ENERGY, BUT MOST NEWER PLANTS USE HOT WATER. AND AS DOCTOR BRESEE EXPLAINS, THESE PLANTS CREATE SOME ENVIRONMENTAL PROBLEMS.

TAPE: CUT TWO -- BRESEE

"THESE HOT WATER PLANTS HAVE TWO SPECIAL PROBLEMS THAT THE STEAM PLANTS DIDN'T HAVE. ONE IS THAT THEY BRING TO THE SURFACE ALONG WITH THE HEAT A LOT OF VERY DIFFICULT MATERIAL TO HANDLE. ONE EXAMPLE IS MERCURY. MERCURY COMES TO THE SURFACE WITH THIS HOT WATER AND AS YOU CAN IMAGINE, A HAZARDOUS MATERIAL MUST BE CAREFULLY HANDLED. THE SAME APPLIES TO ARSENIC. SO THIS REQUIRES A CAREFUL DISPOSAL AND THE SYSTEM THAT IS IN USE IN JAPAN, AND I THINK WILL BE USED THROUGHOUT THE WORLD IS CALLED BRINE RE-INJECTION. YOU SIMPLY DRILL A HOLE BACK DOWN INTO THE SAME RESERVOIR AND PUT THE COLD WATER BACK AFTER TAKING THE HOT WATER OUT."

VOICE: THIS METHOD ALSO HELPS WITH ANOTHER ENVIRONMENTAL PROBLEM. IT HELPS SUPPORT THE EARTH'S SURFACE, WHICH SOMETIMES SAGS WHEN TOO MUCH WATER IS TAKEN OUT. BUT ITS USE REQUIRES CAREFUL STUDY TO KNOW WHERE TO PUT THE COLD WATER BACK INTO THE EARTH. THE WATER MUST BE PLACED WHERE IT CAN BE REHEATED, BUT WITHOUT PUTTING OUT -- SO TO SPEAK -- THE "FIRE" THAT CREATES THE

VOICE:
(CONT'D) ANOTHER NATO STUDY IS ON OTHER USES OF GEOTHERMAL ENERGY
BESIDES FOR ELECTRICITY. AGAIN, DOCTOR BRESEE:

TAPE: CUT THREE -- BRESEE

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"AS YOU CAN PROBABLY IMAGINE, THERE ARE PLENTY OF
PLACES IN THE WORLD FOR HEAT THAT'S GENERALLY SUPPLIED
NOW BY FOSSIL FUELS, OIL, GAS AND SO FORTH. SO,
GEOTHERMAL ENERGY CAN PRODUCE THE SAME HEAT,
GENERALLY CHEAPER, THAN CAN BE PRODUCED BY THESE
TRADITIONAL METHODS, PARTICULARLY NOW THAT ALL OIL,
GAS PRICES HAVE SKYROCKETED. AND THIS IS FOR THINGS
SUCH AS THE PULP AND PAPER INDUSTRY, OR HEATING
HOMES OR EVEN AIR CONDITIONING HOMES OR PROVIDING
PROCESSED HEAT FOR INDUSTRIES OR HEATING GREENHOUSES
IN COLD CLIMATES: A WHOLE VARIETY OF PROGRAMS THAT DO
NOT REQUIRE ELECTRIC POWER PRODUCTION, BUT STILL CAN
BE VERY USEFUL."

AT THE PRESENT TIME, HALF THE HOMES IN ICELAND
ARE HEATED BY GEOTHERMAL ENERGY. IN FRANCE, NEAR
PARIS, FIVE HUNDRED APARTMENTS USE GEOTHERMAL HEAT
AND THE FRENCH GOVERNMENT HOPES EVENTUALLY TO USE
THIS HEAT FOR FIFTY THOUSAND APARTMENTS. THIS IS THE
RESEARCH PROJECT THAT HAS HAD THE WIDEST PARTICIPATION.
SCIENTISTS FROM ELEVEN COUNTRIES, HALF OF THEM NOT
MEMBERS OF N-A-T-O, JOINED IN. AND HUNGARY, WHICH
HAS THE LARGEST NON-ELECTRIC GEOTHERMAL POWER PROGRAM
IN OPERATION IN THE WORLD, HAS BEEN AN INDIRECT
PARTICIPANT.

ANOTHER PROJECT INVOLVES WHAT ARE CALLED DRY HOT ROCKS.
SCIENTISTS FROM SEVERAL COUNTRIES ARE WORKING IN LOS
ALAMOS, NEW MEXICO TO FIND WAYS OF USING GEOTHERMAL ENERGY
IN AREAS WHERE THERE IS HEAT UNDER GROUND, BUT WHERE

NATURE DOES NOT PROVIDE THE WATER OR STEAM NEEDED TO BRING IT TO THE SURFACE. ALL THESE PROJECTS ARE DESIGNED TO INCREASE THE USE OF GEOTHERMAL ENERGY AND MAKE IT AVAILABLE TO MORE PEOPLE.

ANNCR: THIS HAS BEEN ... SCIENCE NOTEBOOK ... A SUMMARY OF EVENTS IN SCIENCE, MEDICINE AND TECHNOLOGY ... BROUGHT TO YOU BY THE VOICE OF AMERICA EVERY WEEK AT THIS TIME. JOIN US AGAIN! NEXT _____ (AT THIS TIME) FOR MORE REPORTS ON DEVELOPMENTS THAT MAY AFFECT OUR DAILY LIVES.

WJL/PBH